```
     (FILE 'USPAT' ENTERED AT 13:08:37 ON 30 JUN 1998)
L1             1 S 5093914/PN
L2             0 S INTELLGENT(A)AGENT
L3          8393 S INTELLIGENT
L4            21 S INTELLIGENT(A)AGENT
L5             1 S L1 AND L4 AND SELECT? AND EXECUT?
L6           132 S INTELLIGENT(P)AGENT#
L7            73 S L6 AND SELECT? AND EXECUT?
L8             0 S L6 AND (DOMAIN(A)KNOWLEDGE)
L9            26 S L7 AND KNOWLEDGE
                 SET PAGELENGTH 99
                 SET AUHELP NONE

=>
```

```
     (FILE 'USPAT' ENTERED AT 10:33:27 ON 30 JUN 1998)
                SET PAGELENGTH 99
                SET AUHELP NONE
L1            21 S INTELLIGENT(A)AGENT
L2             0 S L1 AND (DOMAIN(A)KNOWLEDGE)
L3            21 S L1
L4            16 S L1 AND SELECT? AND EXECUT?

=>
```

```
      Set  Items  Description
      ---  -----  -----------
? s intelligent(n)agent?

         128047  INTELLIGENT
         997431  AGENT?
      S1    2571  INTELLIGENT(N)AGENT?
? s s1 and select? and excut?

           2571  S1
        1920552  SELECT?
            377  EXCUT?
      S2      0  S1 AND SELECT? AND EXCUT?
? s s1 and select? and execut?

           2571  S1
        1920552  SELECT?
         276151  EXECUT?
      S3     43  S1 AND SELECT? AND EXECUT?
```

3/5/4 (Item 4 from file: 2)
DIALOG(R)File 2:INSPEC

5261466 INSPEC Abstract Number: C9606-7420-033
Title: A streamlined software environment for situated skills
Author(s): Yu, S.T.; Slack, M.G.; Miller, D.P.
Author Affiliation: AI Tech. Center, Mitre Corp., McLean, VA, USA
Conference Title: Conference on Intelligent Robotics in Field, Factory, Service, and Space (CIRFFSS `94) (NASA CP 3251) Part vol.1 p.233-9 vol.1
Editor(s): Erickson, J.D.
Publisher: NASA, Linthicum Hights, MD, USA
Publication Date: 1994 Country of Publication: USA 2 vol. xv+885 pp.
Material Identity Number: XX94-01258
Conference Title: Proceedings of Conference on Intelligent Robots in Factory, Field, Space and Service
Conference Sponsor: AIAA; NASA
Conference Date: 21-24 March 1994 Conference Location: Houston, TX, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P)
Abstract: This paper documents a powerful set of software tools used for developing situated skills. These situated skills form the reactive level of a three-tiered **intelligent agent** architecture developed at the MITRE Corporation. The architecture is designed to allow these skills to be manipulated by a task level engine which is monitoring the current situation and **selecting** skills necessary for the current task. The idea is to coordinate the dynamic activations and deactivations of these situated skills in order to configure the reactive layer for the task at hand. The heart of the skills environment is a data flow mechanism which pipelines the currently active skills for **execution**. A front end graphical interface serves as a debugging facility during skill development and testing. We are able to integrate skills developed in different languages into the skills environment. The power of the skills environment lies in the amount of time it saves for the programmer to develop code for the reactive layer of a robot. (10 Refs)
Descriptors: graphical user interfaces; intelligent control; knowledge acquisition; knowledge verification; robot programming; software agents; software tools; testing
Identifiers: streamlined software environment; situated skills; software tools; three-tiered **intelligent agent**; MITRE Corporation; task level engine; monitoring; reactive layer; data flow; front end graphical interface; debugging; skill development; testing; skills environment; robot programming; intelligent robots
Class Codes: C7420 (Control engineering computing); C3390 (Robotics); C6170 (Expert systems); C6110 (Systems analysis and programming)

3/5/5 (Item 5 from file: 2)
DIALOG(R)File 2:INSPEC

03528997 INSPEC Abstract Number: C90009586
Title: Characterizing knowledge depth in intelligent safety systems
Author(s): Finin, T.; Klein, D.
Author Affiliation: Paoli Res. Center, Unisys Corp., PA, USA
Journal: Applied Artificial Intelligence vol.3, no.2-3 p.129-42
Publication Date: 1989 Country of Publication: USA
CODEN: AAINEH ISSN: 0883-9514
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: Intelligent process control may be viewed as encompassing four major tasks. An **intelligent agent** must monitor the target system to obtain the values of relevant state variables in order to detect problems and to ascertain the status of the components that may be employed in responding to those problems. An **intelligent agent** must determine plans for managing the current situation. An **intelligent agent** must **select** a response (the 'best' one) through a process of plan evaluation. Finally, to carry out the chosen response, the agent must perform plan **execution**. While monitoring and **execution** are relatively straightforward operations, plan determination and plan evaluation may be accomplished in a number of ways that vary in their relative depth of reasoning. The authors sketch an analysis for the reasoning underlying plan determination and evaluation tasks for a class of intelligent control systems that attempt to provide a safety function. This analysis has two objectives: to illustrate a domain-independent mode of analysis for examining progressively deeper models, and to make the analysis available to those interested in building systems that provide safety functions. (21 Refs)
Descriptors: artificial intelligence; computerised monitoring; process computer control; safety systems
Identifiers: intelligent process control; problem detection; system monitoring; response **selection**; domain independent analysis mode; knowledge depth; intelligent safety systems; **intelligent agent**; state variables; plan evaluation; plan **execution**; plan determination; reasoning
Class Codes: C7420 (Control engineering); C6170 (Expert systems); C1230 (Artificial intelligence); C3350 (Industrial production systems); C3370L (Remote signalling, dispatching and safety devices)

3/5/6 (Item 1 from file: 6)
DIALOG(R)File 6:NTIS

1815392 NTIS Accession Number: N94-30556/2
Streamlined Software Environment for Situated Skills
Yu, S. T. ; Slack, M. G. ; Miller, D. P.
MITRE Corp., McLean, VA.
Corp. Source Codes: 045505000; M4167812
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Mar 94 7p
Languages: English
Journal Announcement: GRAI9418; STAR3208
In NASA. Johnson Space Center, Conference on Intelligent Robotics in Field, Factory, Service, and Space (Cirffss 1994), Volume 1 p 233-239.
NTIS Prices: (Order as N94-30526/5, PC A20/MF A04)
Country of Publication: United States
This paper documents a powerful set of software tools used for developing situated skills. These situated skills form the reactive level of a three-tiered **intelligent agent** architecture. The architecture is designed to allow these skills to be manipulated by a task level engine which is monitoring the current situation and **selecting** skills necessary for the current task. The idea is to coordinate the dynamic activations and deactivations of these situated skills in order to configure the reactive layer for the task at hand. The heart of the skills environment is a data flow mechanism which pipelines the currently active skills for **execution** . A front end graphical interface serves as a debugging facility during skill development and testing. We are able to integrate skills developed in different languages into the skills environment. The power of the skills environment lies in the amount of time it saves for the programmer to develop code for the reactive layer of a robot.
Descriptors: *Autonomy; *Information flow; *Programming languages; *Robot control; *Robots; *Software tools; Program verification (Computers); Programmers
Identifiers: NTISNASA
Section Headings: 62GE (Computers, Control, and Information Theory--General); 62B (Computers, Control, and Information Theory--Computer Software)

5/8 (Item 2 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

02853571 E.I. Monthly No: EI9002013127
Title: Characterizing knowledge depth in intelligent safety systems.
Author: Finin, Tim; Klein, David
Corporate Source: Unisys Corp, Paoli, PA, USA
Source: Applied Artificial Intelligence v 3 n 2-3 1989 p 129-142
Publication Year: 1989
CODEN: AAINEH ISSN: 0883-9514
Language: English
Document Type: JA; (Journal Article) Treatment: A; (Applications); T; (Theoretical)
Journal Announcement: 9002
Abstract: Intelligent process control may be viewed as encompassing four major tasks. An **intelligent agent** must monitor the target system to obtain the values of relevant state variables in order to detect problems and to ascertain the status of the components that may be employed in responding to those problems. An **intelligent agent** must determine plans for managing the current situation. An **intelligent agent** must **select** a response (the 'best' one) through a process of plan evaluation. Finally, to carry out the chosen response, the agent must perform plan **execution**. In this paper we sketch an analysis for the reasoning underlying plan determination and evaluation tasks for a class of intelligent control systems that attempt to 'provide a safety function. (Edited author abstract) 21 Refs.
Descriptors: *ARTIFICIAL INTELLIGENCE--*Expert Systems; CONTROL SYSTEMS; SYSTEMS SCIENCE AND CYBERNETICS--Cognitive Systems
Identifiers: KNOWLEDGE DEPTH; REASONING TASKS
Classification Codes:
723 (Computer Software); 731 (Automatic Control Principles)
72 (COMPUTERS & DATA PROCESSING); 73 (CONTROL ENGINEERING)

3/5/9 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05646207 Genuine Article#: WM885 Number of References: 88
Title: Permissive planning: Extending classical planning to uncertain task domains
Author(s): DeJong GF (REPRINT) ; Bennett SW
Corporate Source: UNIV ILLINOIS,DEPT COMP SCI, 405 N MATTHEWS AVE/URBANA//IL/61801 (REPRINT); UNIV ILLINOIS,BECKMAN INST/URBANA//IL/61801; SRA CORP,/ARLINGTON//VA/
Journal: ARTIFICIAL INTELLIGENCE, 1997, V89, N1-2 (JAN), P173-217
ISSN: 0004-3702 Publication date: 19970100
Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
Language: English Document Type: ARTICLE
Geographic Location: USA
Subfile: CC ENGI--Current Contents, Engineering, Computing & Technology;
Journal Subject Category: COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE; ERGONOMICS
Abstract: Uncertainty, ~~in~~herent in most real-world domains, can cause failure of apparently sound classical plans. On the other hand, reasoning with representations that explicitly reflect uncertainty can engender significant, even prohibitive, additional computational costs. This paper contributes a novel approach to planning in uncertain domains, The approach is an extension of classical planning. Machine learning is employed to adjust planner bias in response to **execution** failures, Thus, the classical planner is conditioned towards producing plans that tend to work when **executed** in the world.

The planner's representations are simple and crisp; uncertainty is

represented and reasoned about only during learning. The user-supplied domain theory is left intact. The operator definitions and the planner's projection ability remain as the domain expert intended them. Some structuring of the planner's bias space is required. But with suitable structuring the approach scales well. The learning converges using no more than a polynomial number of examples. The system then probabilistically guarantees that either the plans produced will achieve their goal when **executed** or that adequate planning is not possible with the domain theory provided. An implemented robotic system is described.

Descriptors--Author Keywords: planning ; learning ; uncertainty ; machine learning ; explanation-based learning ; planning bias

Identifiers--KeyWord Plus(R): GOALS

Research Fronts: 95-0671 003 (MECHANICAL ASSEMBLY; MODELING DECISION-SUPPORT SYSTEMS; UNIFIED FRAMEWORK; REPRESENTATION LANGUAGE; MOTION PLANNING CAPABILITY FOR 3D-SPACE POSTURAL GOALS)

95-1992 002 (MOTION PLANNING OF MOBILE ROBOTS; FAST COLLISION DETECTION; REAL-TIME NAVIGATION; POLYGONAL OBSTACLES; REINFORCEMENT LEARNING)

95-0137 001 (LOGIC PROGRAMS; DEDUCTIVE DATABASES; FULLY ABSTRACT COMPOSITIONAL SEMANTICS)

95-0403 001 (SAMPLE COMPLEXITY OF WEAK LEARNING; VAPNIK-CHERVONENKIS DIMENSION; VACILLATORY FUNCTION IDENTIFICATION)

95-0891 001 (BAYESIAN NETWORKS; PROBABILISTIC REASONING; DIAGNOSTIC SYSTEMS; MODELING UNCERTAINTY; CLASSIFICATION ALGORITHMS; STOCHASTIC CONDITIONAL-INDEPENDENCE)

95-0934 001 (VISUAL REPRESENTATION SYSTEM; VERBAL REASONING; USER ERRORS)

95-2166 001 (OPTIMAL SEQUENTIAL **SELECTION** PROCEDURE)

95-2431 001 (NEURAL NETWORKS; FUZZY MODEL-REFERENCE ADAPTIVE-CONTROL; NONLINEAR DISCRETE-TIME MULTIVARIABLE DYNAMICAL-SYSTEMS)

95-5743 001 (KNOWLEDGE BASES; **INTELLIGENT AGENTS**;